



HAWAII COOPERATIVE EXTENSION SERVICE

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CARE FOR YOUR GARDEN—USE WINDBREAKS

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Hawaii is at the northern edge of the tropics, where the prevailing winds are the northeasterly trades. These winds are generally 8 to 20 miles per hour, but gusts up to 40 miles per hour or more may occur. These trade winds blow for 300 days or more each year. During the absence of the trade winds, it is possible to have "kona" winds from an opposite or variable direction. These winds are usually associated with stormy weather of higher velocity than the normal trades, and gusts up to 80 miles per hour or more may occur.

Winds of different velocities have different effects on garden plants. Effects depend on the nature of the wind, the plant, climatic factors, and the amount of protection provided. Reduction of wind velocity is provided by barriers, or windbreaks, that allow more favorable conditions for soils and plant development. The best protection is one that reduces wind velocities to safe levels.

Effects of Wind in the Garden

The wind may break branches and cause misshapen plants, damaged fruit or vegetables, soil loss, abrasion of plants by the blown soil, and loss of production and quality of produce. Soil loss is most likely to occur in sandy soils or those that have little or no structure and erode easily. Wind-blown soil particles hit plant stems, leaves, fruits, and flowers and cause damage to plant tissues. This damage reduces the movement of moisture and nutrients in the plant and, through damage to the chloroplasts in the leaves, reduces carbohydrate production. Continuous wind, even at low velocities, will train the plant to grow away from the direction of the wind, forming misshapen plants. Fruit production, especially on the windward side, will be reduced, and the fruit will be small and of poor quality. As wind velocities increase, leaves or branches will be blown away; if the wind is strong

enough the plant will be blown over or broken off. The net result is that garden production will be decreased and the quality of the produce will be lower.

Types of Windbreaks

Windbreaks may be permanent or temporary, planted or constructed, and dense or permeable. Permanent windbreaks are those designed to last for a long time. Temporary windbreaks are designed to last for relatively short periods. Planted windbreaks are those consisting of living plants and may be used as permanent or temporary windbreaks. Generally, the tall, slow-growing species are used for permanent windbreaks and the relatively low, fast-growing species for temporary windbreaks. Constructed windbreaks may consist of a wide variety of materials. Constructed windbreaks are usually temporary until planted materials grow sufficiently to provide the desired protection. Dense windbreaks are those that allow little or no wind to pass through them. Permeable windbreaks allow wind to pass through them but at a reduced velocity. Permeable windbreaks, which reduce turbulence behind them and allow a smoother flow of air, are generally considered more desirable than dense windbreaks. Permeability should be 20 to 50 percent to adequately reduce wind velocity with minimum turbulence.

Most home vegetable gardens are relatively small and are easily protected. They may be completely enclosed by windbreaks that would protect crops from variable winds. The most suitable windbreaks are those that can be easily and quickly established and easily removed after the garden has been harvested. Generally, this means a fast-growing temporary windbreak or a constructed windbreak. The windbreak should be at least twice as tall as the tallest plants to be protected. Remember that the

velocity of the wind will be reduced to 50 percent at a distance 10 times the height of the windbreak, and even more at 6 to 7 times the height of the windbreak. For example, a row of lettuce planted 40 feet inside a 4-foot windbreak will be exposed to only half-strength wind. In many garden areas the protective fences around the property may provide adequate protection for plants.

Installing and Maintaining Windbreaks

The windbreaks must be placed crosswise to the direction of prevailing winds. This often is difficult in areas of tall buildings, as they may cause the wind to come from various directions, even from above. Continuous windbreaks are most effective, as gaps in the windbreaks may channel the wind and increase soil erosion and plant damage in those areas.

When establishing the windbreak, prepare plans far enough in advance so that planting materials, supplies, and equipment are available at the time you wish to begin.

Windbreaks should be planted or constructed to provide protection to the plant from the time it is planted until it is harvested. If planted windbreaks

are used, they should be fertilized and watered to provide strong, healthy, fast-growing plants for protection from the wind. If constructed windbreaks are used, they should be built of material that will withstand the wind velocity and provide the necessary protection to the plants. A combination of planted and constructed windbreaks may be used.

All windbreaks must be maintained. Replace diseased plants and those weakened by insects. Protect the plants from the effects of animals, which may cause breakage or other types of damage. Planted windbreaks require fertilizer, water, sunlight, and protection. Constructed windbreaks should receive proper maintenance as required.

For more information, refer to Circular 438, "Windbreaks for Hawaii"; Circular 447, "Trees and Shrubs for Windbreaks in Hawaii"; and Circular 473, "Constructed Windbreaks." These circulars are published by the University of Hawaii Cooperative Extension Service. You also may get advice from County Extension Offices in each county of Hawaii.